

Exp-Function Method for N -Soliton Solutions of Nonlinear Differential-Difference Equations

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In this paper, the exp-function method is generalized to construct N -soliton solutions of nonlinear differential-difference equations. With the aid of symbolic computation, we choose the Toda lattice to illustrate the validity and advantages of the generalized work. As a result, 1-soliton, 2-soliton, and 3-soliton solutions are obtained, from which the uniform formula of N -soliton solutions is derived. It is shown that the exp-function method may provide us with a straightforward and effective mathematical tool for generating N -soliton solutions of nonlinear differential-difference equations in mathematical physics.

Key words: Nonlinear Differential-Difference Equations; Exp-Function Method;
 N -Soliton Solutions.